

## ABSTRACT

A fully dry etch method is described for removing a high k dielectric layer from a substrate without damaging the substrate and has a high selectivity with respect to a gate layer. The etch is comprised of  $\text{BCl}_3$ , a fluorocarbon, and an inert gas. A low RF bias power is preferred. The method can also be used to remove an interfacial layer between the substrate and the high k dielectric layer. A  $\text{HfO}_2$  etch rate of 55 Angstroms per minute is achieved without causing a recess in a silicon substrate and with an etch selectivity to polysilicon of greater than 10:1. Better STI oxide divot control is also provided by this method. The etch through the high k dielectric layer may be performed in the same etch chamber as the etch process to form a gate electrode.